UNCLOS Article 76- Formulae and constraint lines

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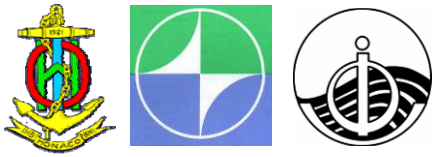
ABLOS TUTORIAL SESSION - Article 76 of UNCLOS
10th October 2005



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National Oceanography Centre, Southampton
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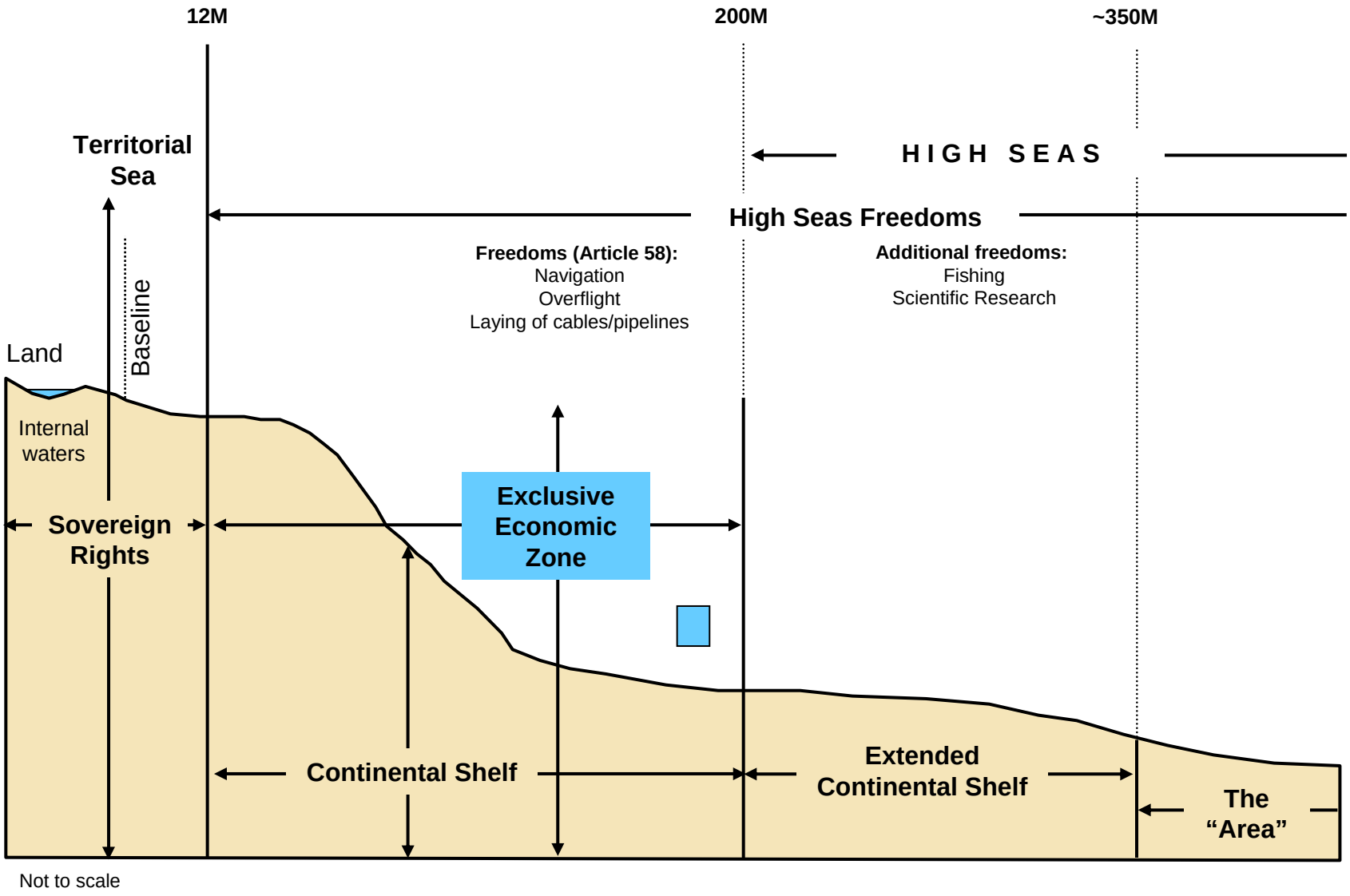
Maritime Limits

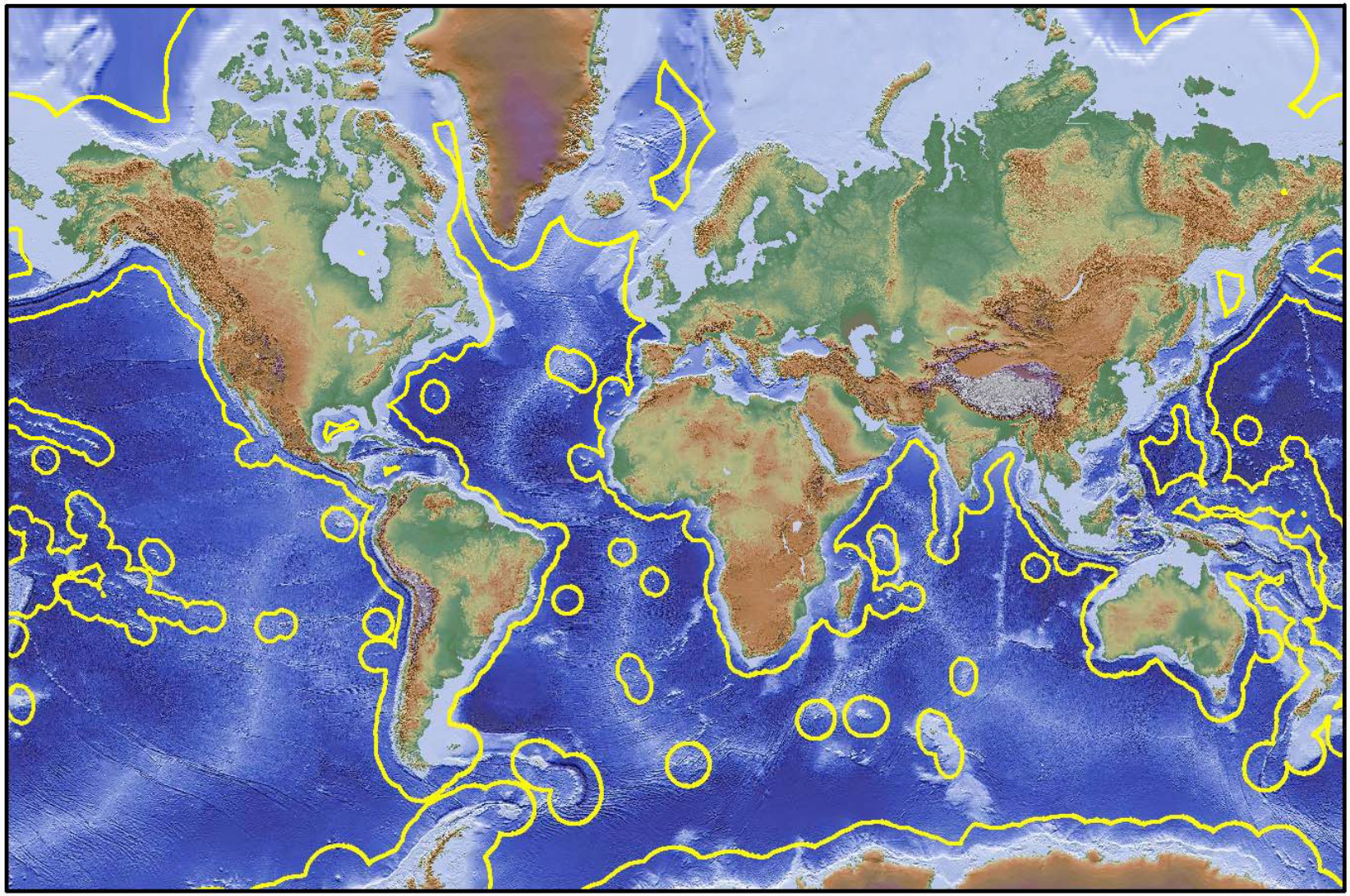


Article 76 - paragraph 1

"The continental shelf of a coastal State comprises the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin,

or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance".

Exclusive Economic Zones (200M)

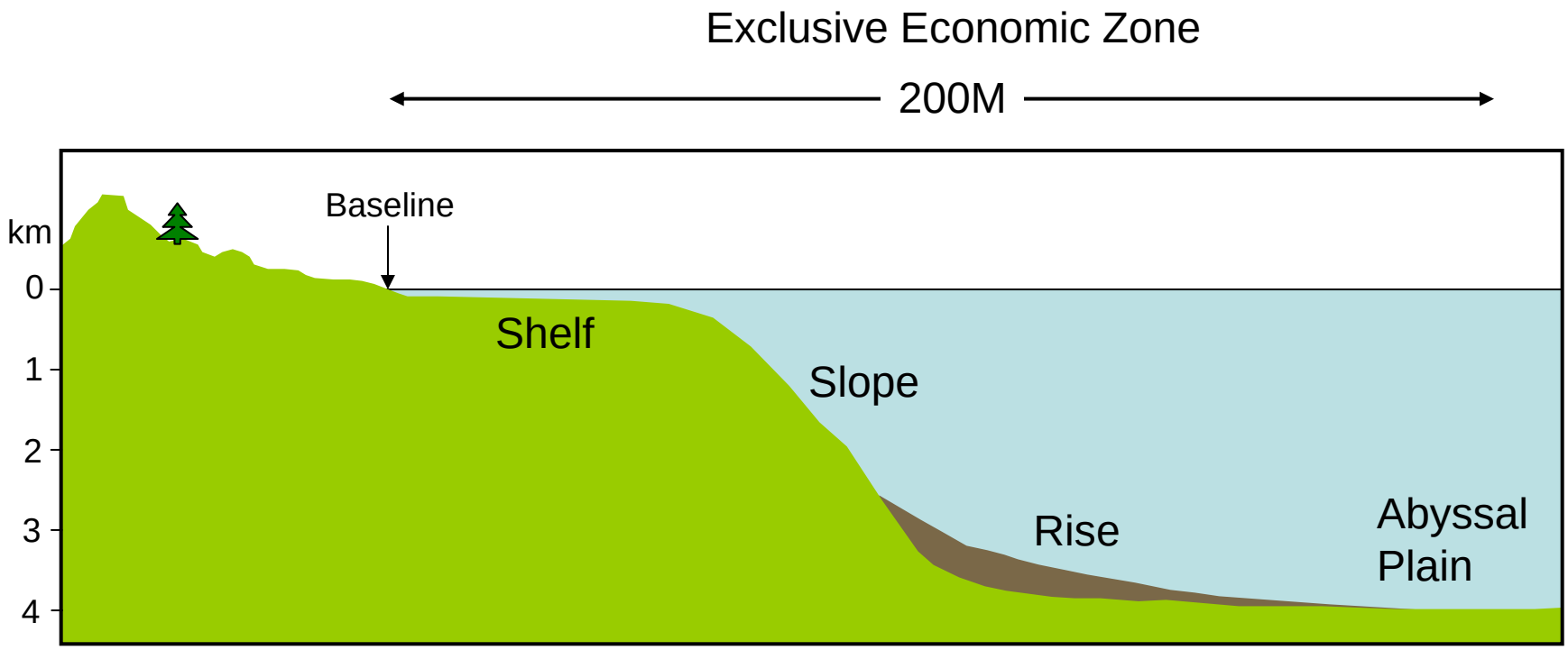


UNCLOS Article 76 - paragraph 3

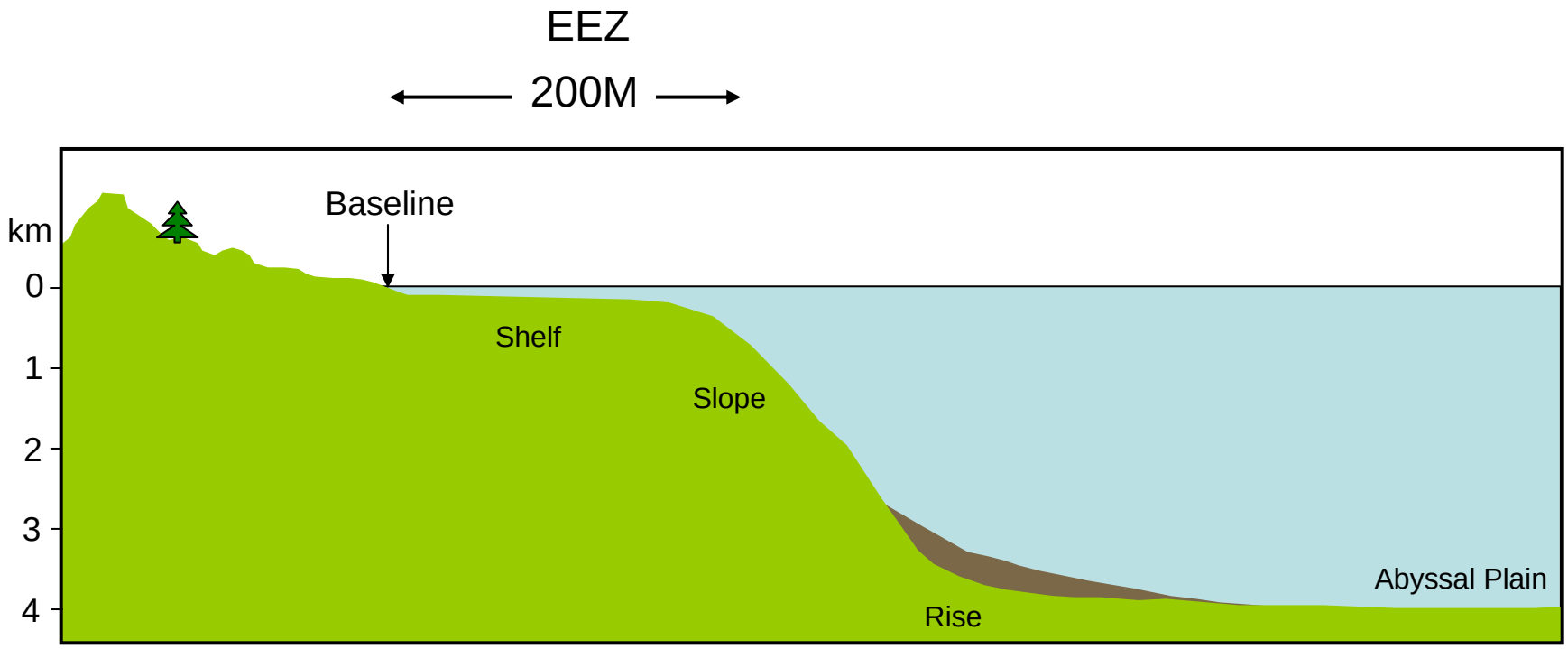
The continental margin comprises:

- Submerged prolongation of the land mass of the coastal state;
- Consists of the seabed and subsoil of the shelf, slope and rise;
- Does not include the deep ocean floor (with its oceanic ridges or the subsoil thereof).

Continental Margin - no Article 76 claim



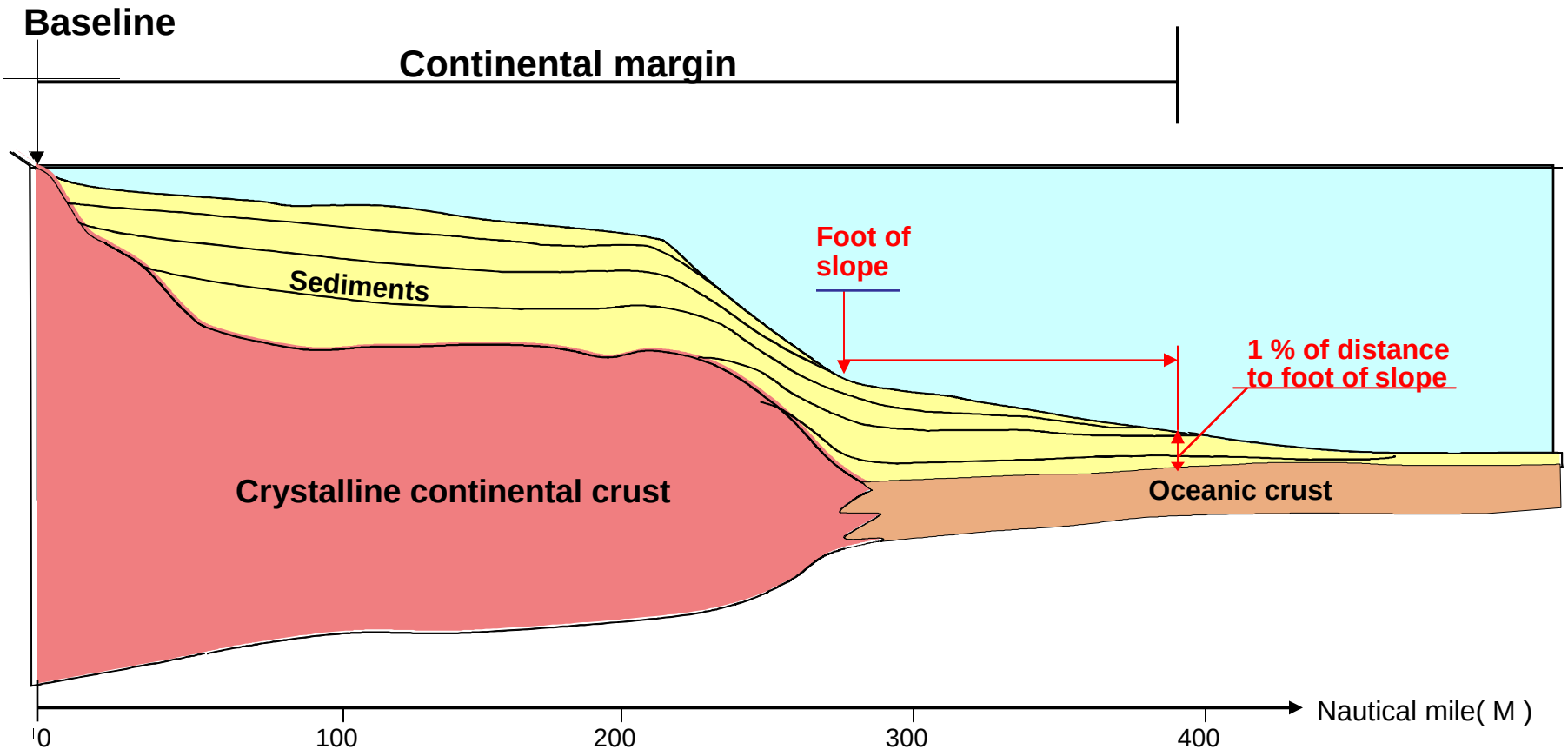
Wide Continental Shelf - potential for Article 76 claim



Legal definition of the outer limits of a continental shelf beyond 200 nautical miles: the “formulae lines” - paragraph 4

- Claim lines for the outer limit are straight lines joining points no more than 60M apart
- The claimant must establish that at each point, either:
  - The thickness of sedimentary rock is 1% of the distance to the nearest point on the foot of the slope
  - The distance to the nearest point on the foot of the slope is 60M
- Whichever is the greater

Determination of the outer edge of the continental margin by sediment thickness - para 4a (i)

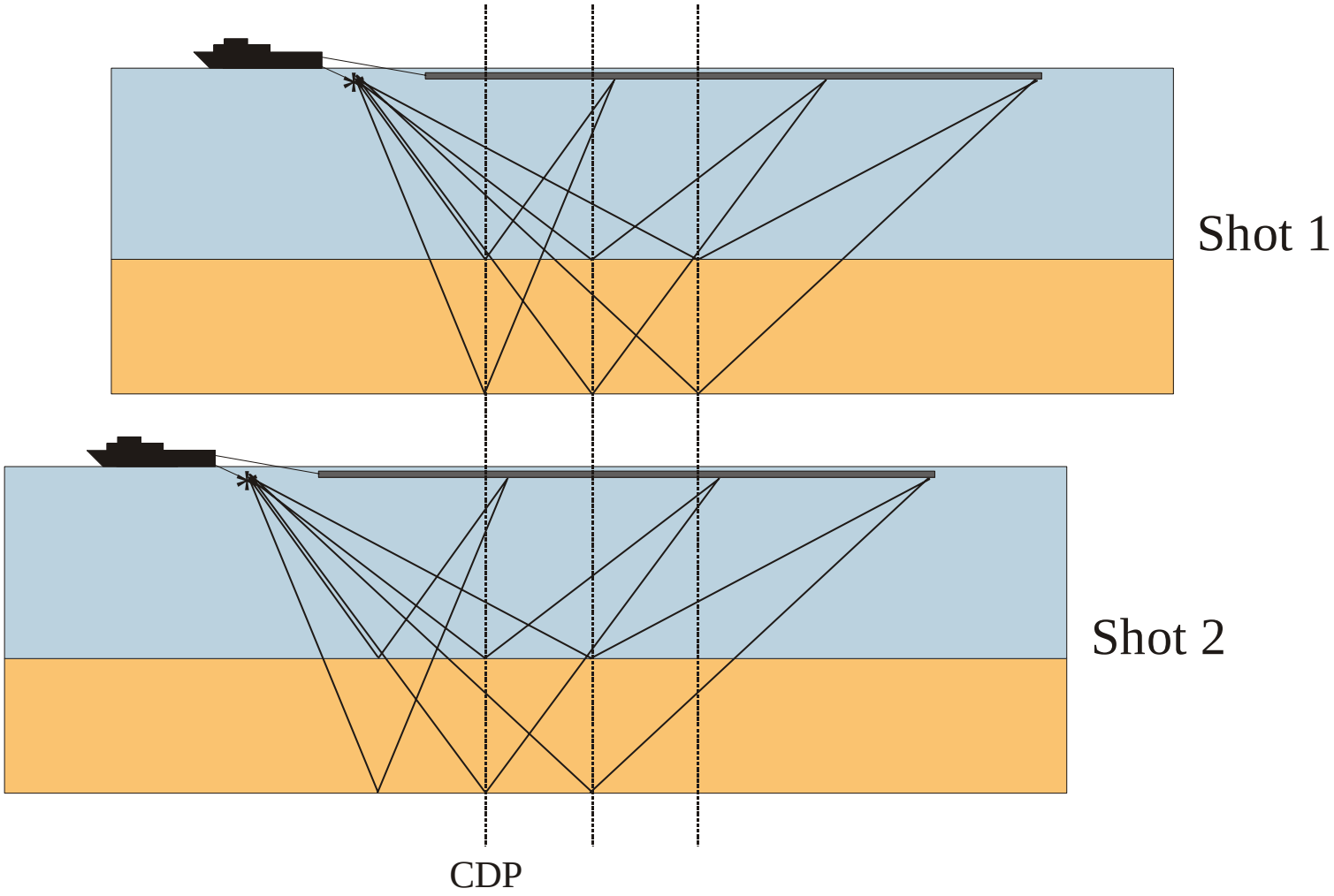


Definition of sediment thickness

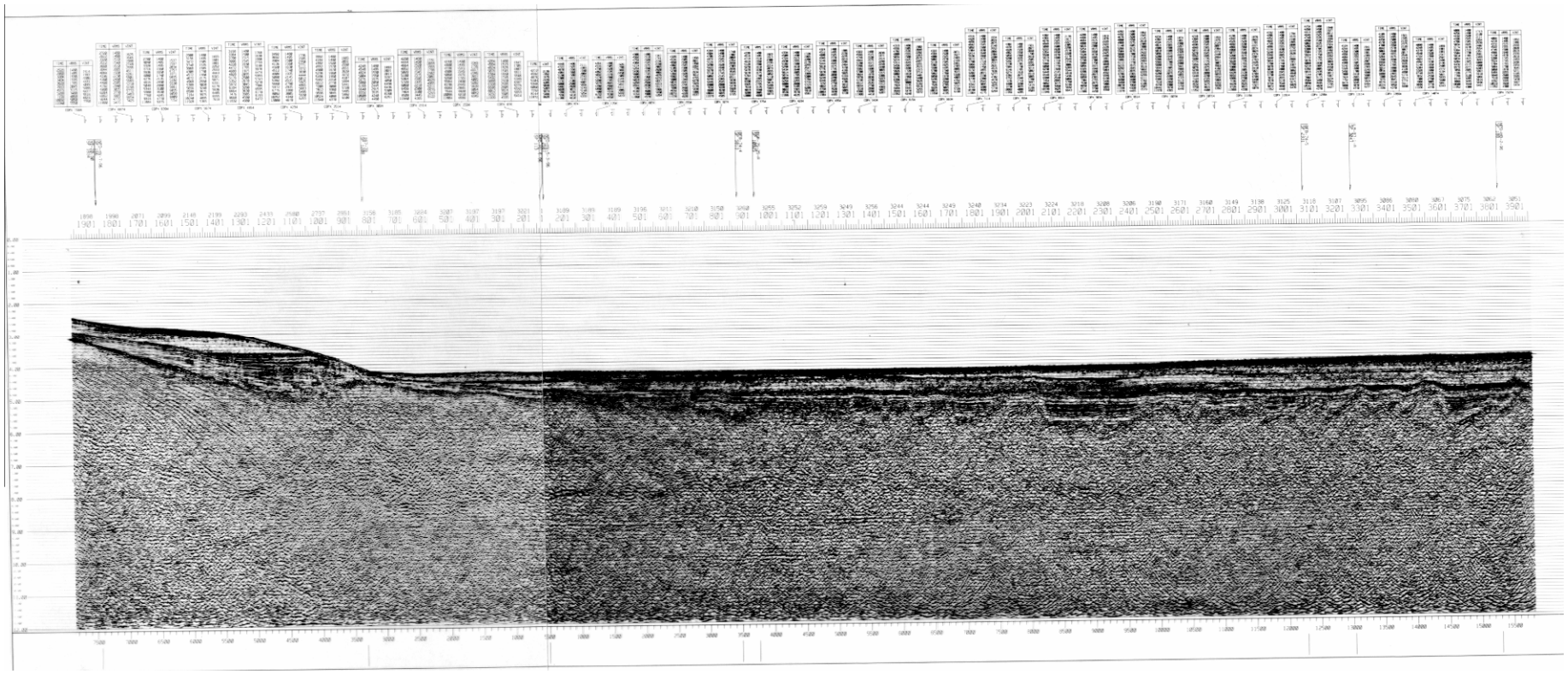
"The sediment thickness at any location on the continental margin is the vertical distance from the sea floor to the top of the basement at the base of the sediments, regardless of the slope of the sea floor or the slope of the top basement surface."

CLCS/11, paragraph 8.1.8

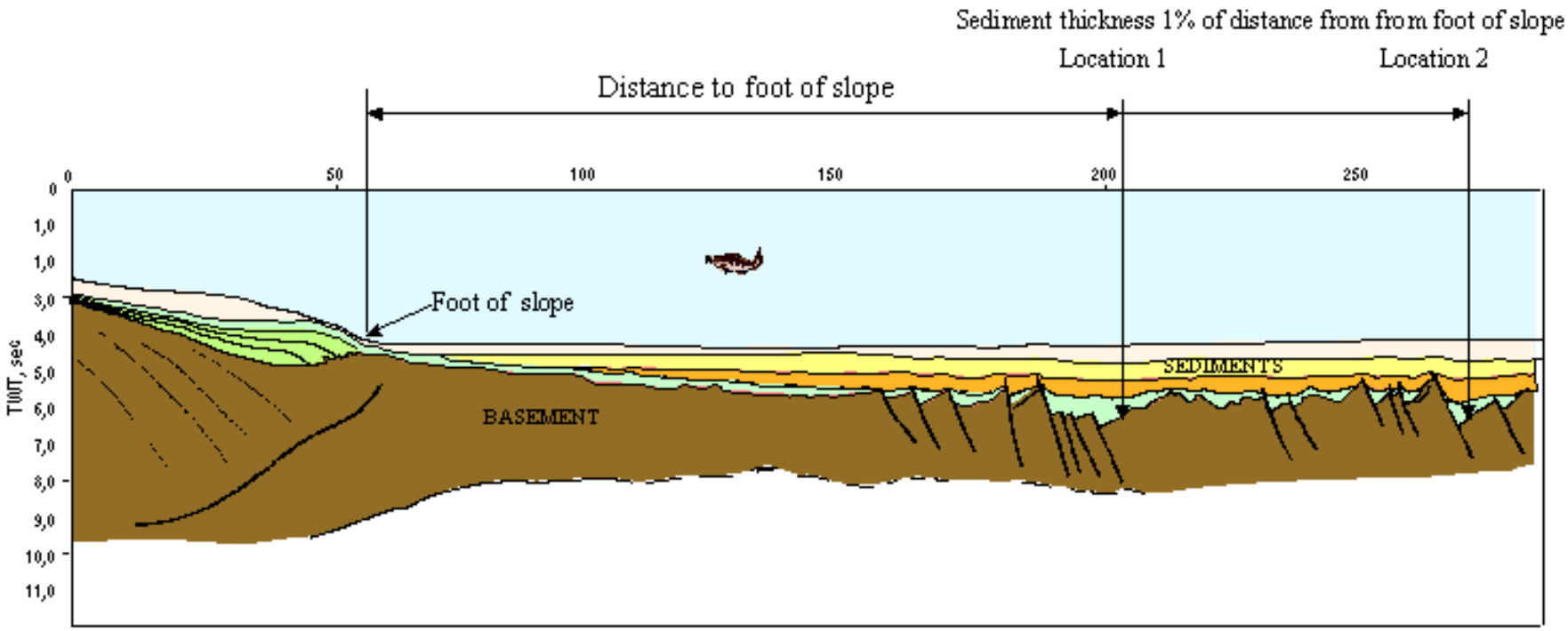
Seismic reflection profiling



Multichannel seismic records



Interpreted basement and sediment sections

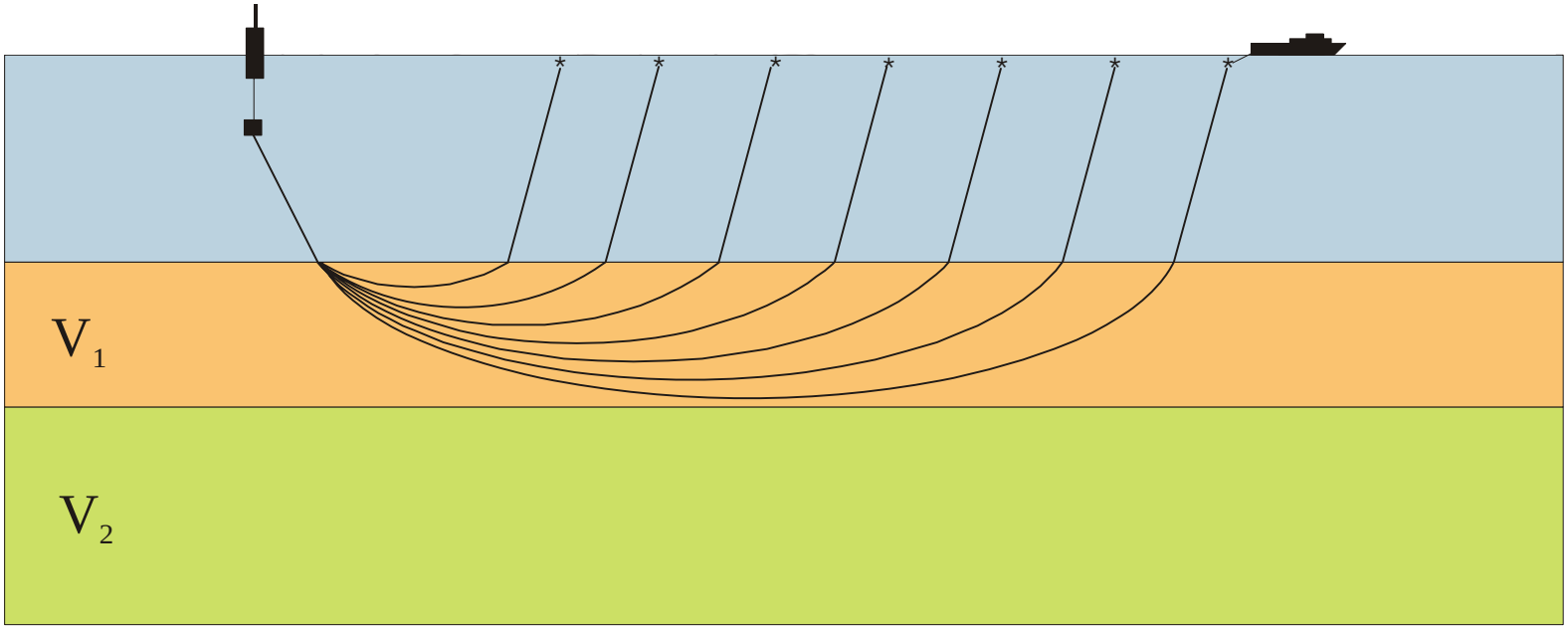


Depth conversion

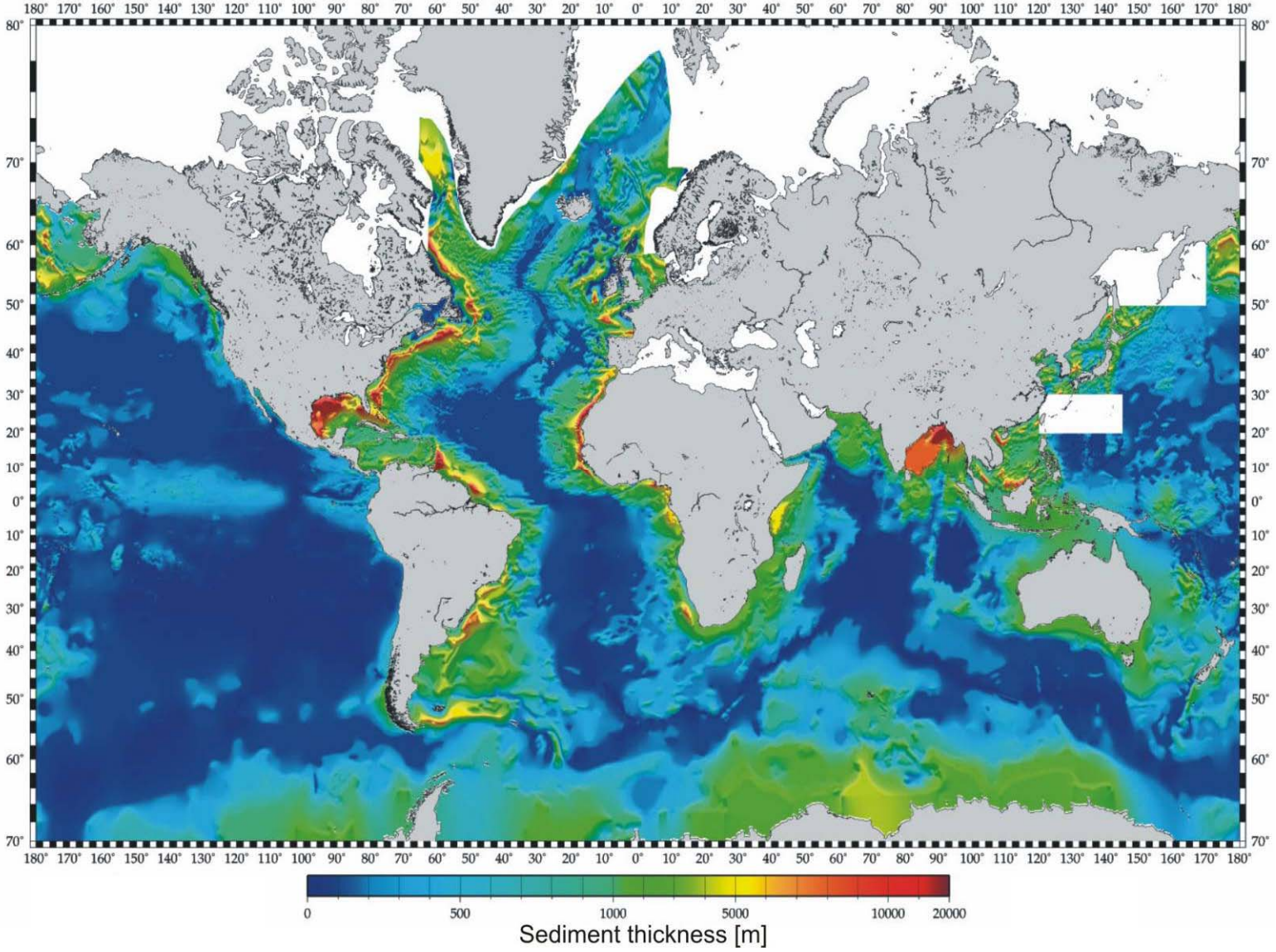
”The estimation of sediment thickness requires the depth conversion of the interpreted profiles and maps. This depth conversion of the geophysical data should be documented by the relevant database and the description of the method applied.” CLCS/11, paragraph 8.3.1

”Depth conversion of seismic data requires velocity data to build a velocity model for the sediment wedge. Such velocity models describe the vertical and/or lateral variation in seismic propagation velocities within the sedimentary sequences.” CLCS/11, paragraph 8.3.9

Sonobuoy Data - to derive time/depth conversion



Global sediment thickness distribution



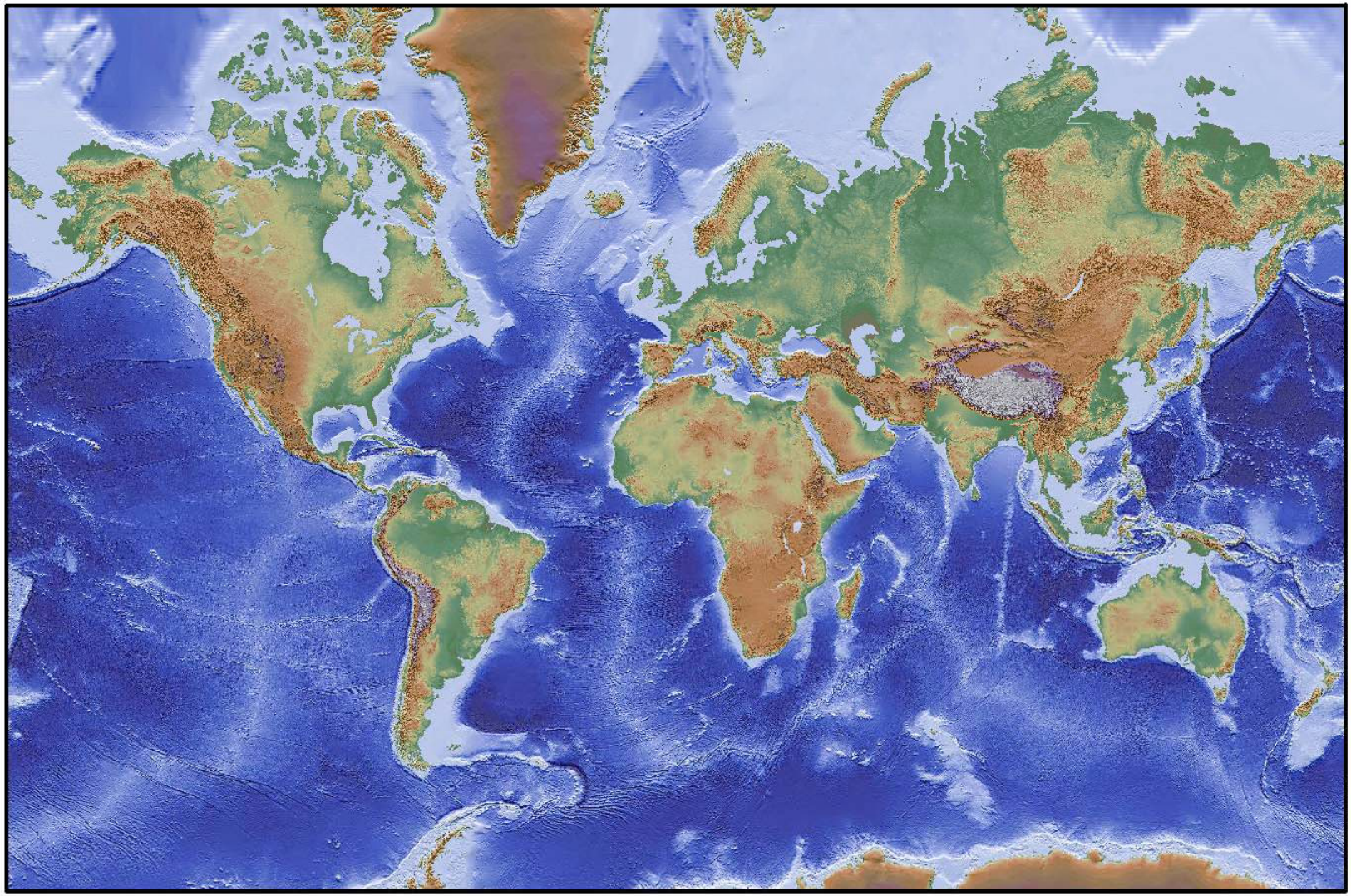
Data sources (mainly reflection seismic)

- Regional government/industry surveys for continental margin reconnaissance mapping
- Localised, detailed 2D and 3D industry surveys for hydrocarbon exploration
- Detailed 2D site surveys for scientific drilling programs
- Widely spaced and scattered academic/oceanographic institution surveys

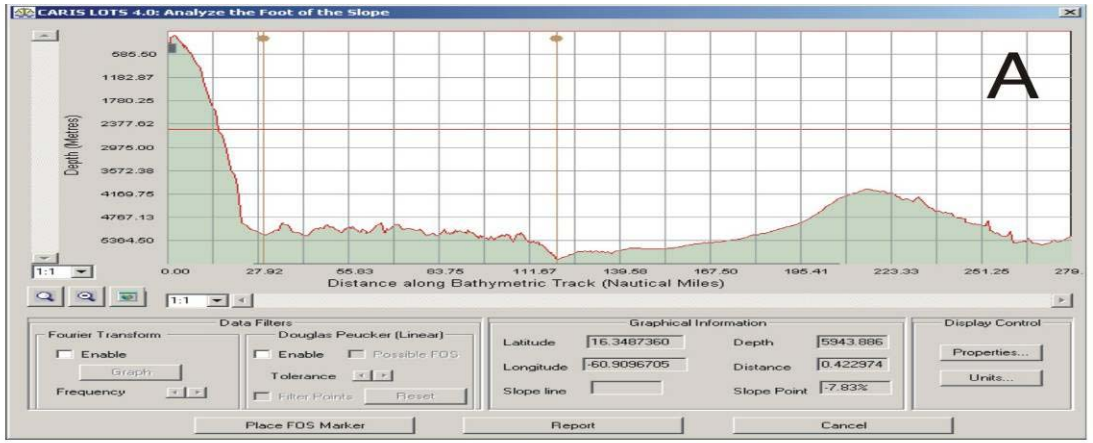
Foot of Slope?

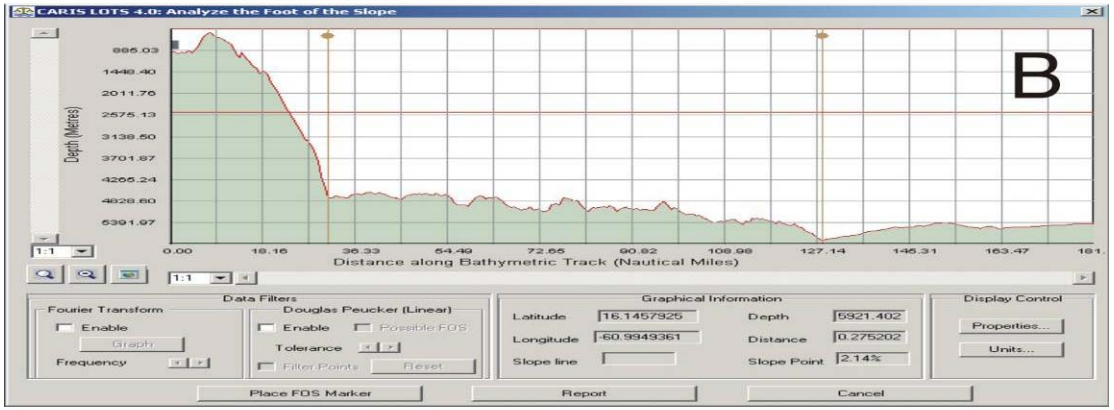
- In the absence of evidence to the contrary, the foot of the continental slope shall be determined as the point of maximum change in the gradient at its base. (Art 76/4b)

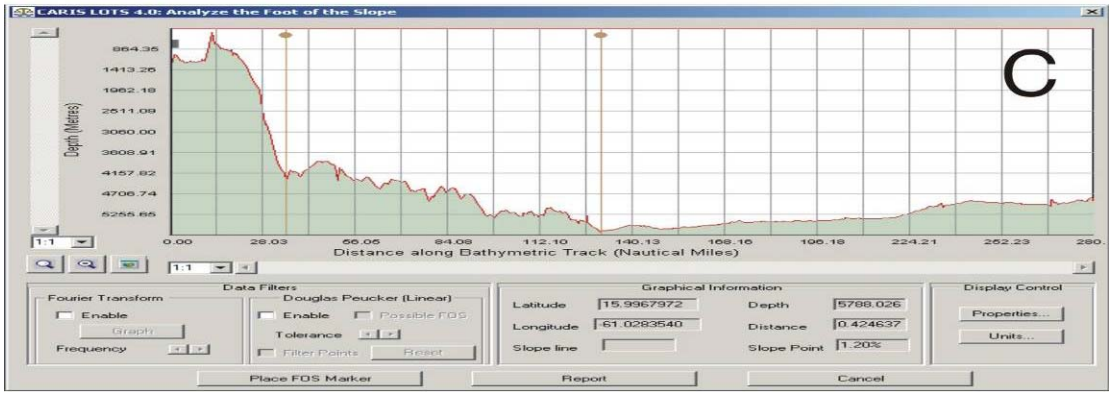
Global Topography



“Normal” foot of slope locations

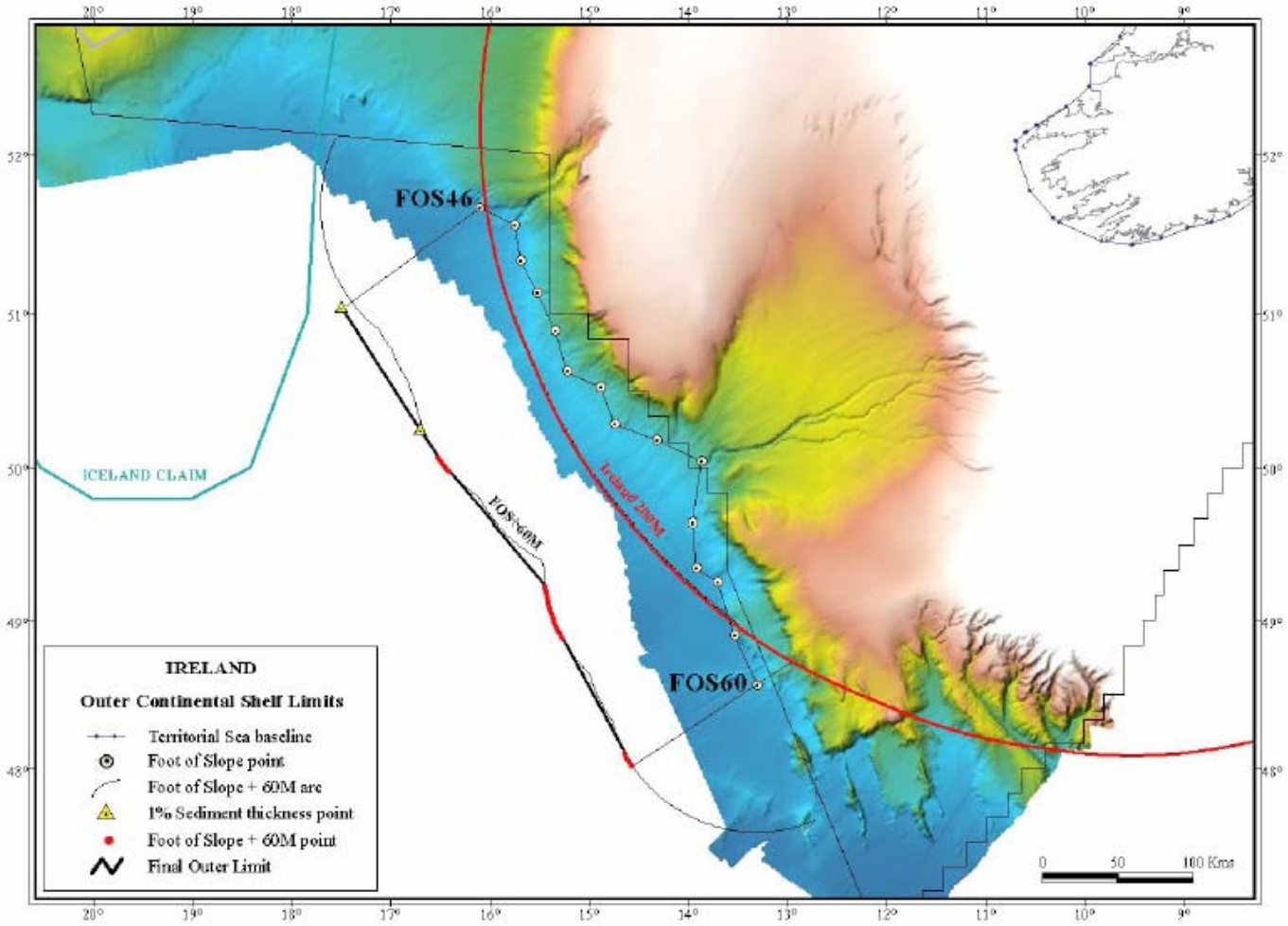




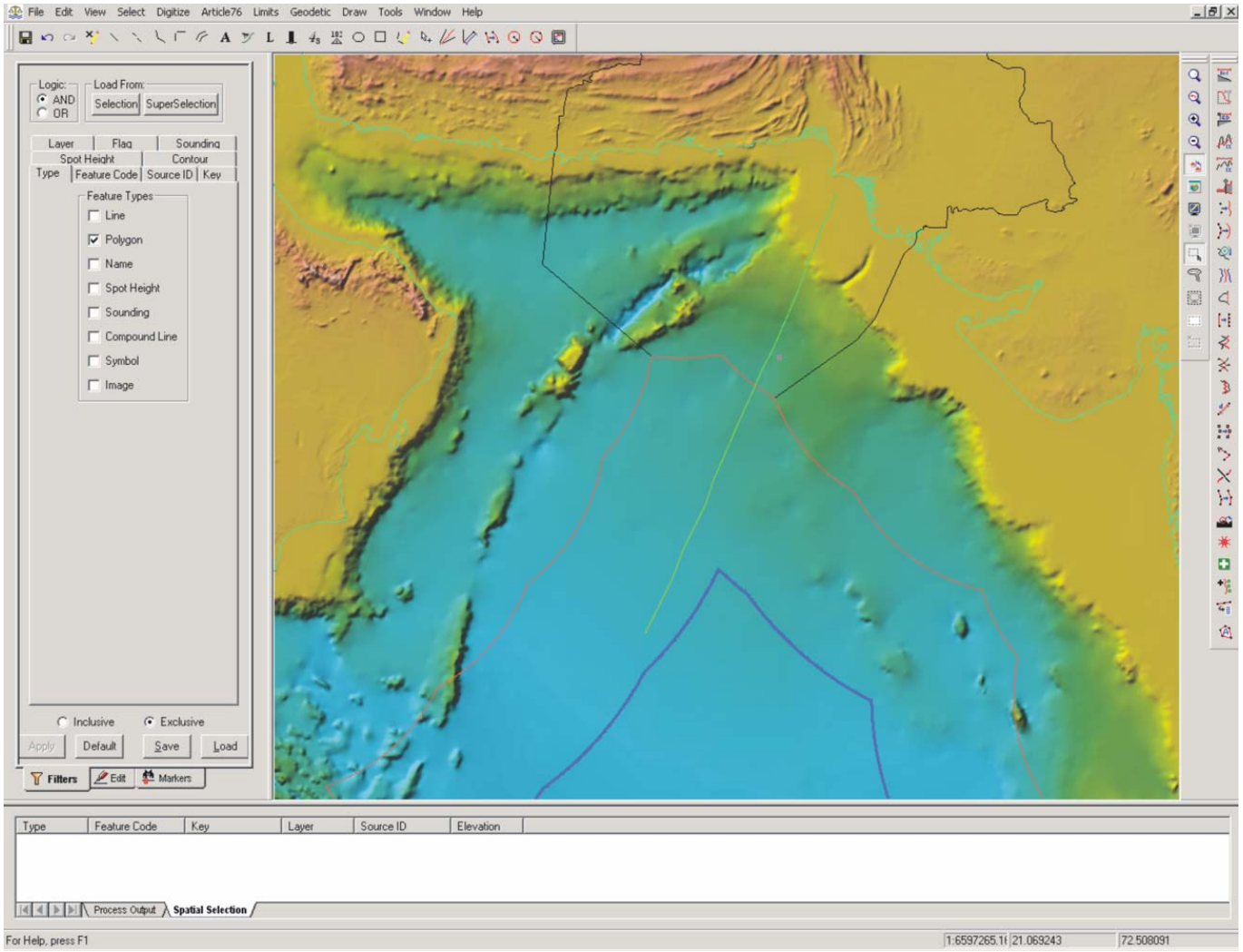


- Software required
- Data quality

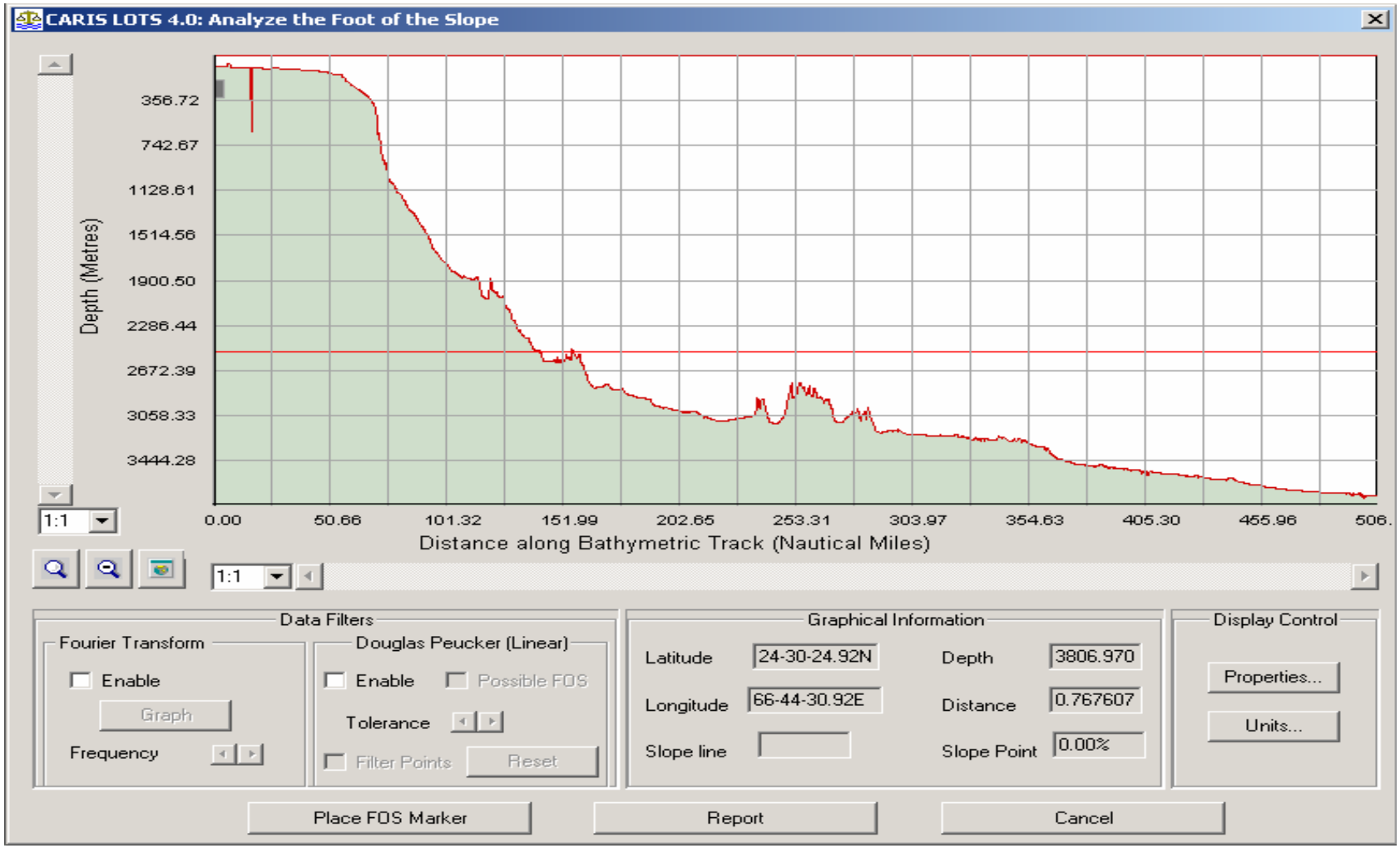
The Hedberg solution - foot of slope plus 60 nautical miles (Ireland: May 2005)



Difficult FOS location - NW Indian Ocean



Smoothly curving seafloor - absent/multiple FOS options

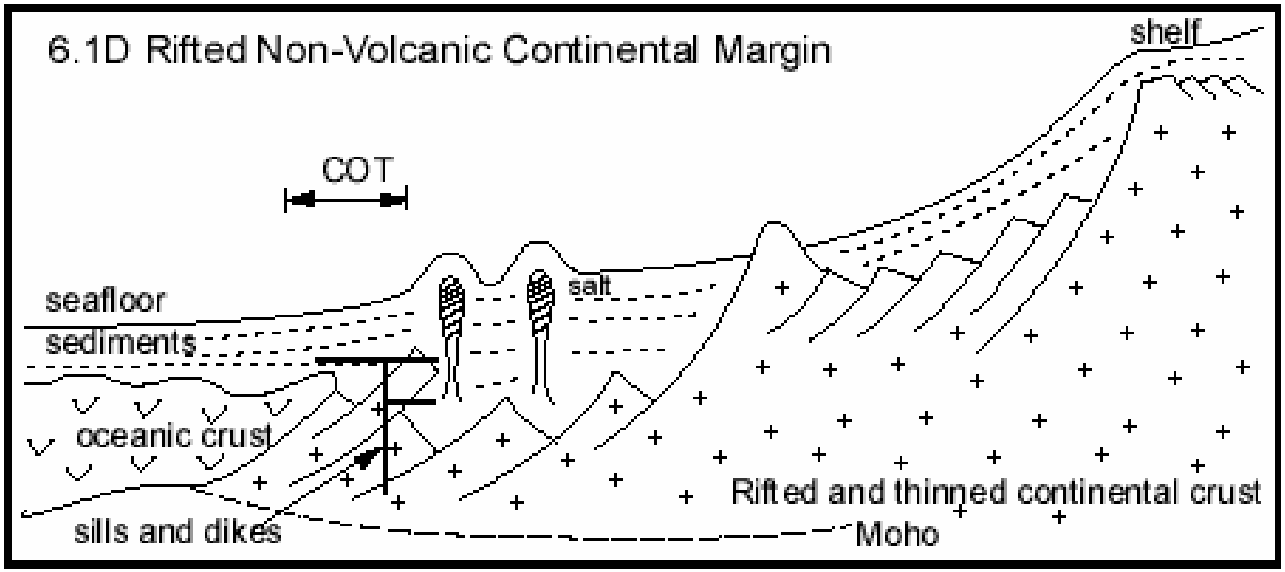


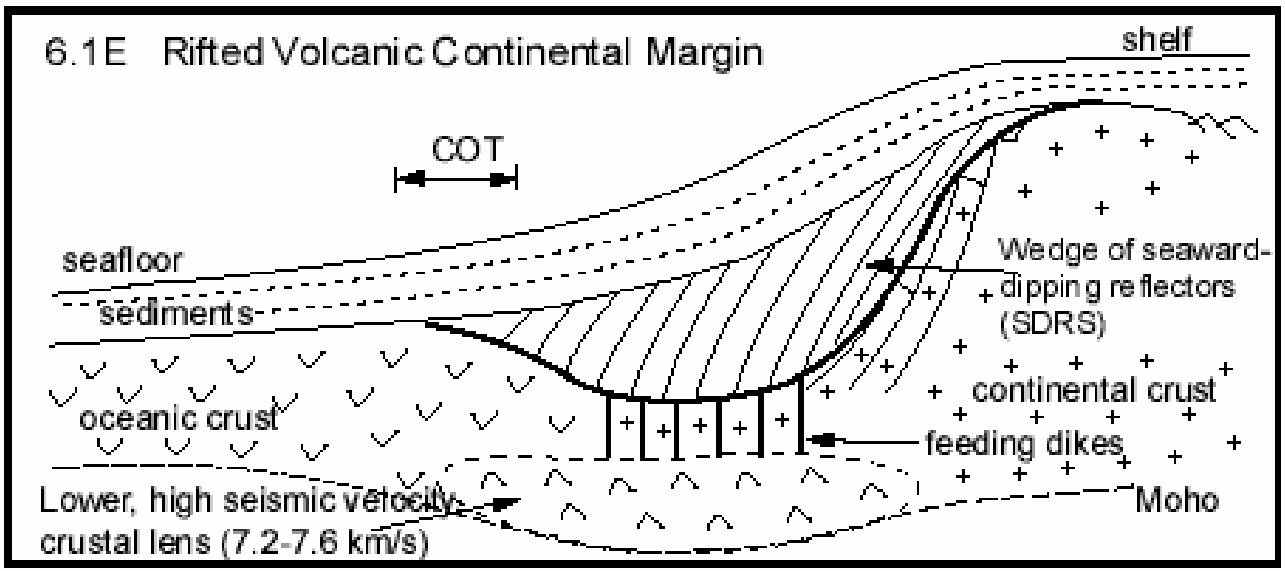
Evidence to the contrary - Paragraph 4b

In the absence of evidence to the contrary, the foot of slope of the continental slope shall be determined as the point of maximum change of gradient at its base

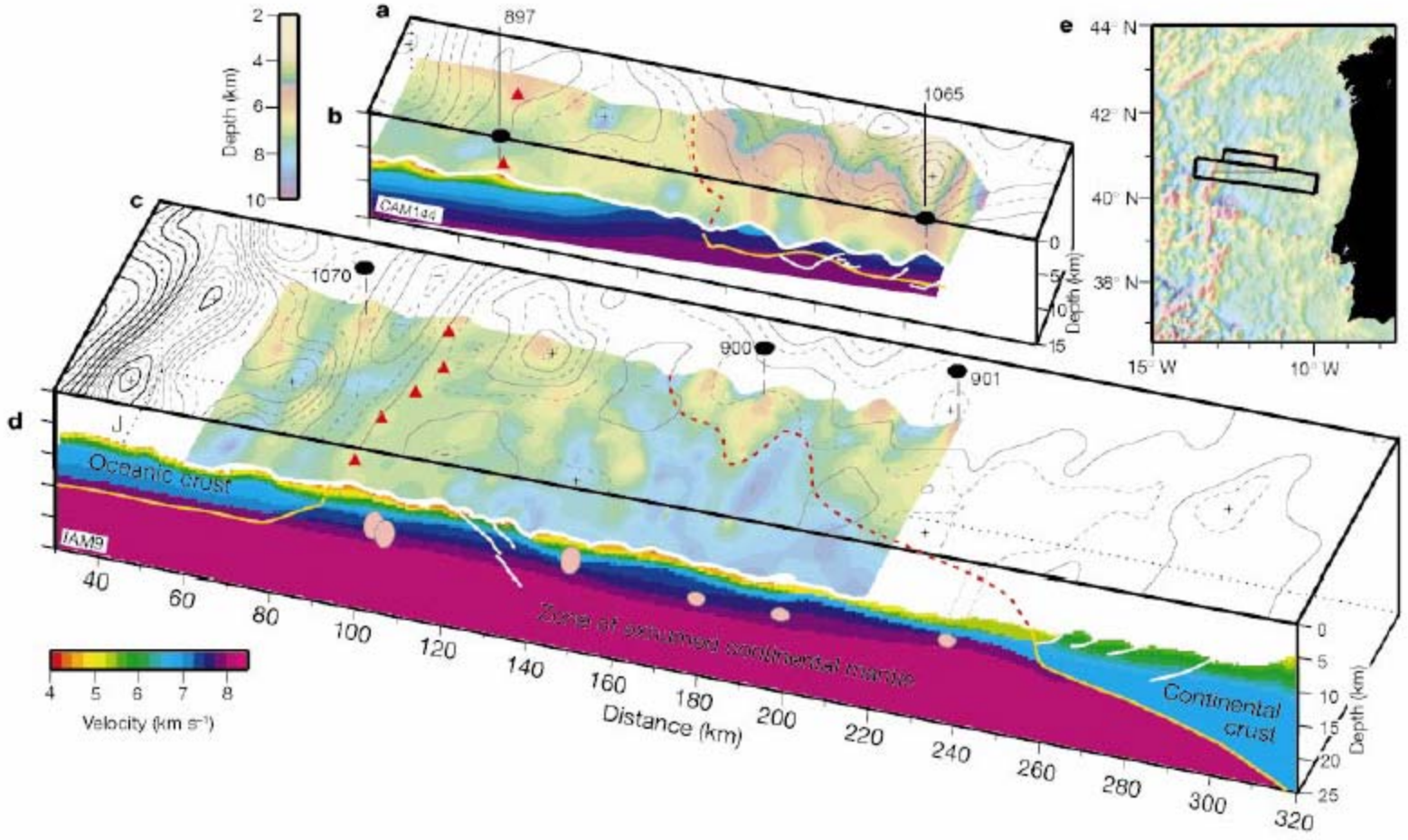
- What is meant by evidence to the contrary? (CLCS 11, Section 6)
- Is it an exception to a ‘general rule’? (para 6.3.4, but)
- How applicable is it to my margin?

Rifted volcanic and non-volcanic margins





Non-volcanic rifted margin - width of transition



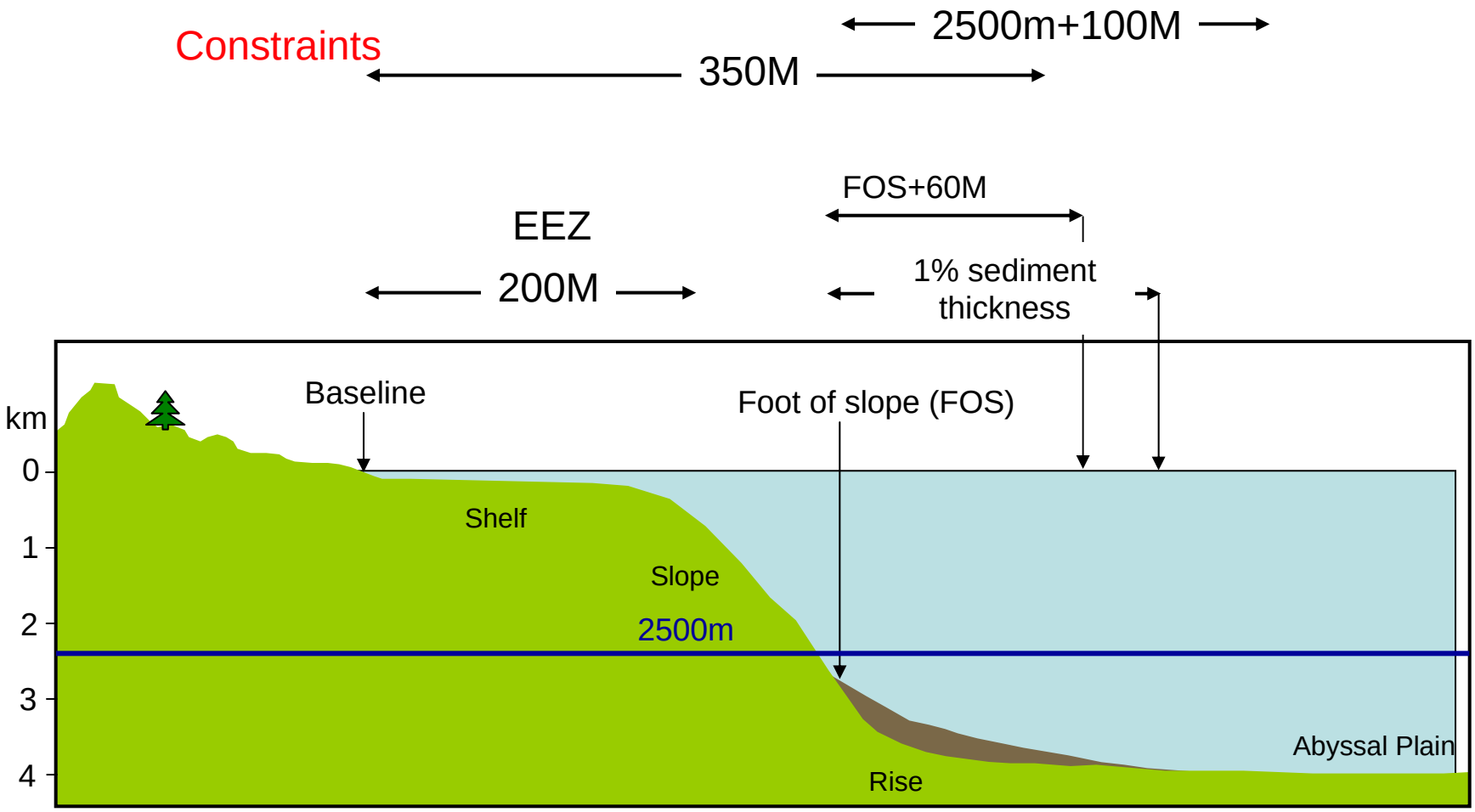
Some of the options to locate the FOS by evidence to the contrary?

- Continent Ocean Transition
- Salt diapirism
- Tectonics at sheared or convergent margins
- Deformation fronts at leading edge of sediment loaded margins
- ????

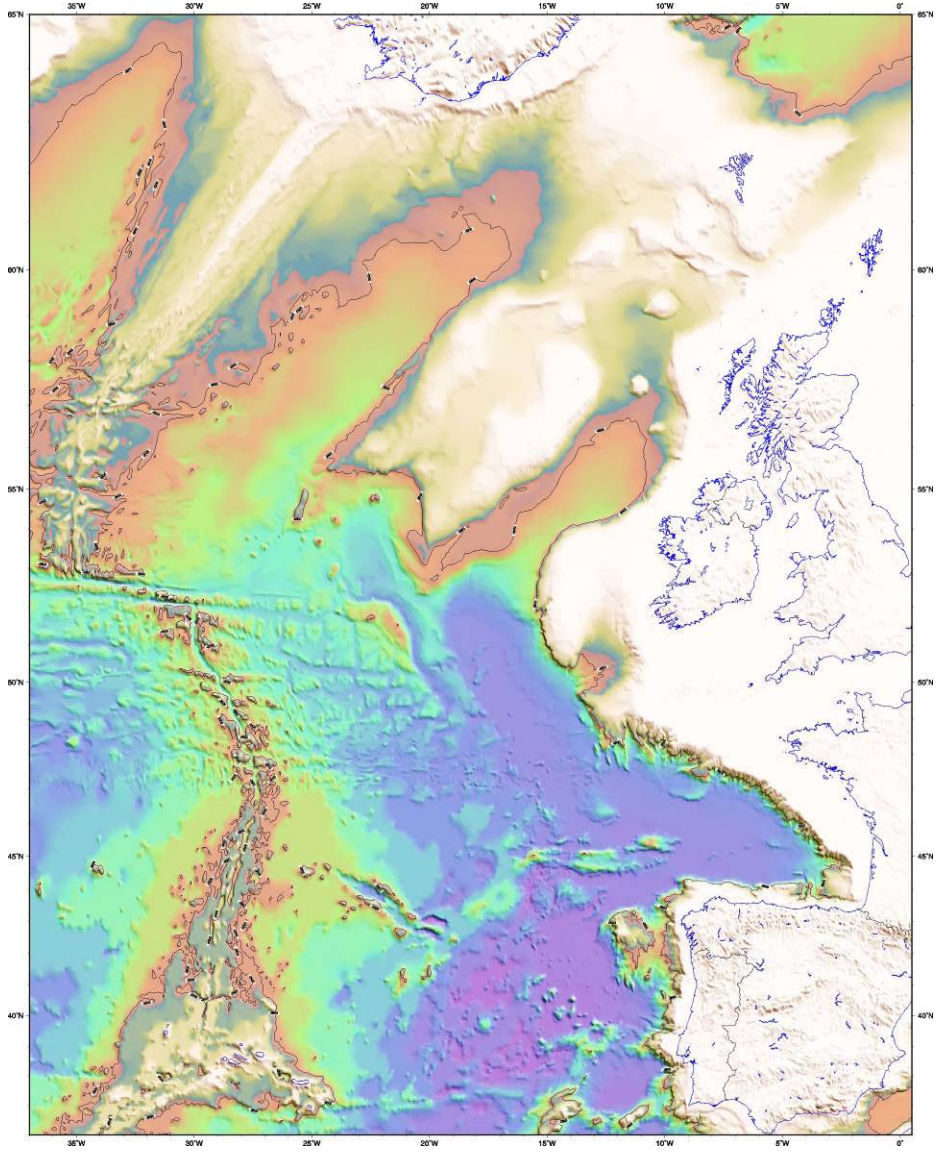
Constraints to claims - paragraph 5

- The outer limits defined by the formulae lines shall not exceed either:
  - 350M from the nearest point of the baseline
  - 100M from the nearest point of the 2,500 meter depth contour
- Whichever is the greater

Extended Continental Shelf



Special case for submarine ridges - paragraph 6



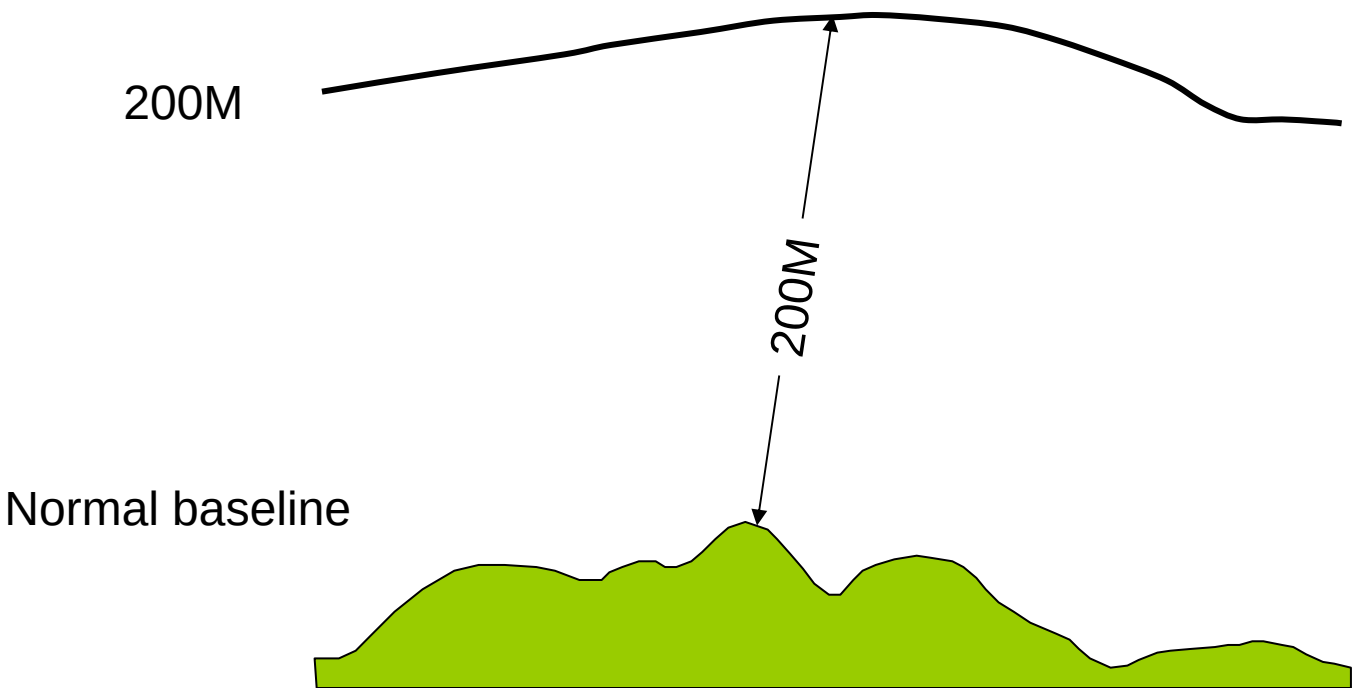
…on submarine ridges, the outer limit of the continental shelf shall not exceed 350 nautical miles

Practical construction of an outer limit

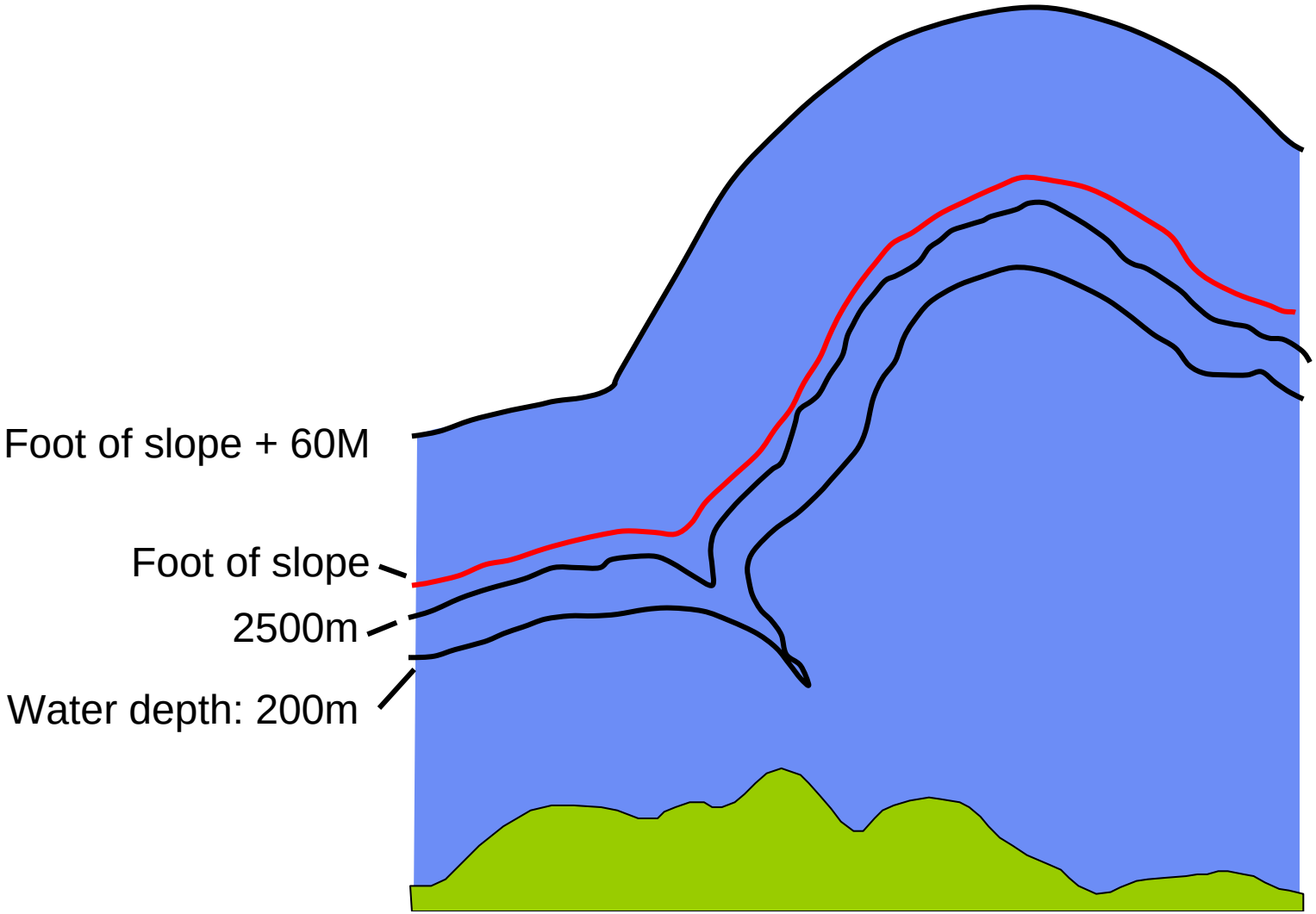
- Formulae
  - FOS plus 60 M
  - FOS plus 1% sediment thickness

- Contraints
  - 2500m plus 100 M
  - 350 M

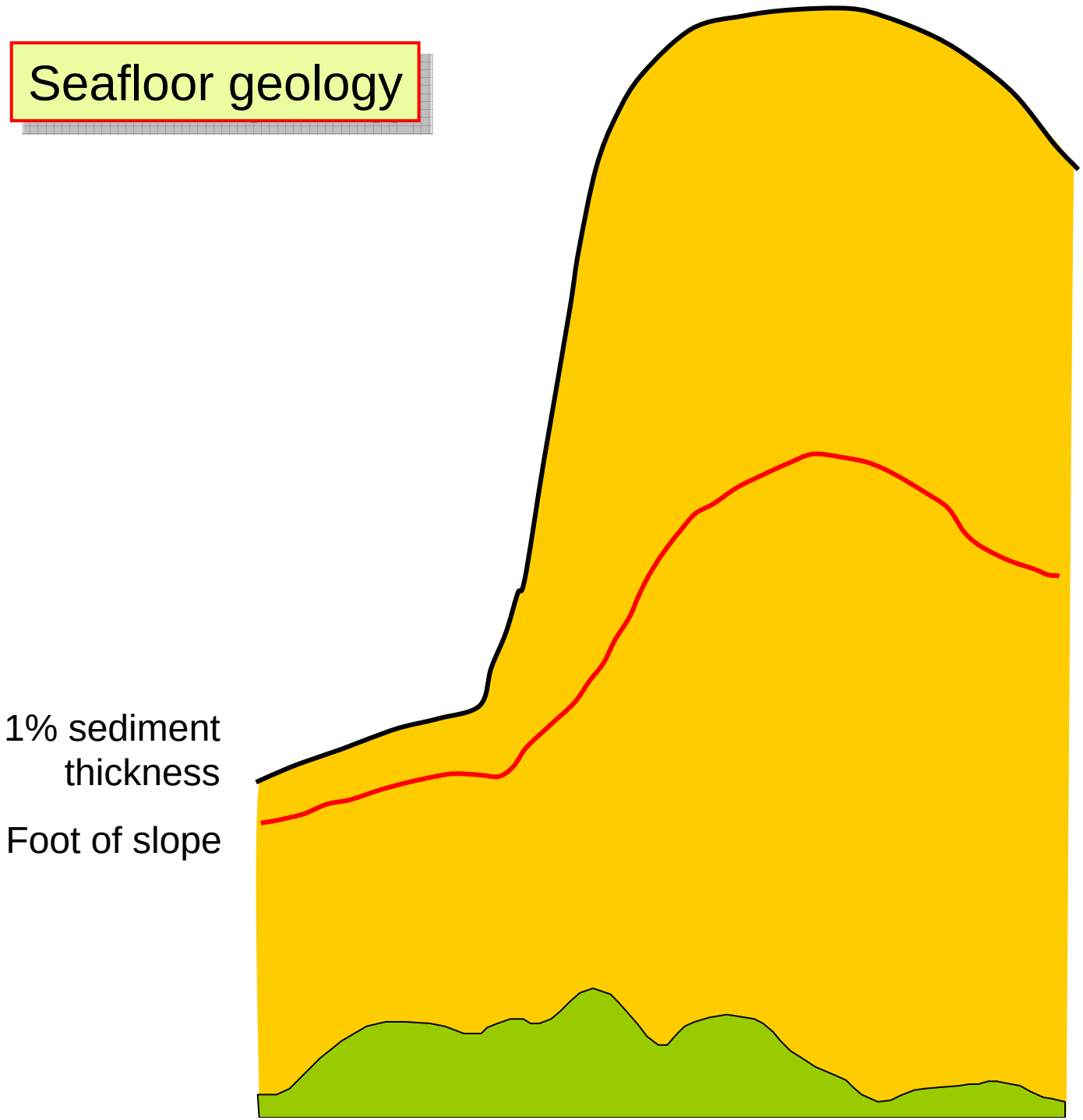
Coastal baselines



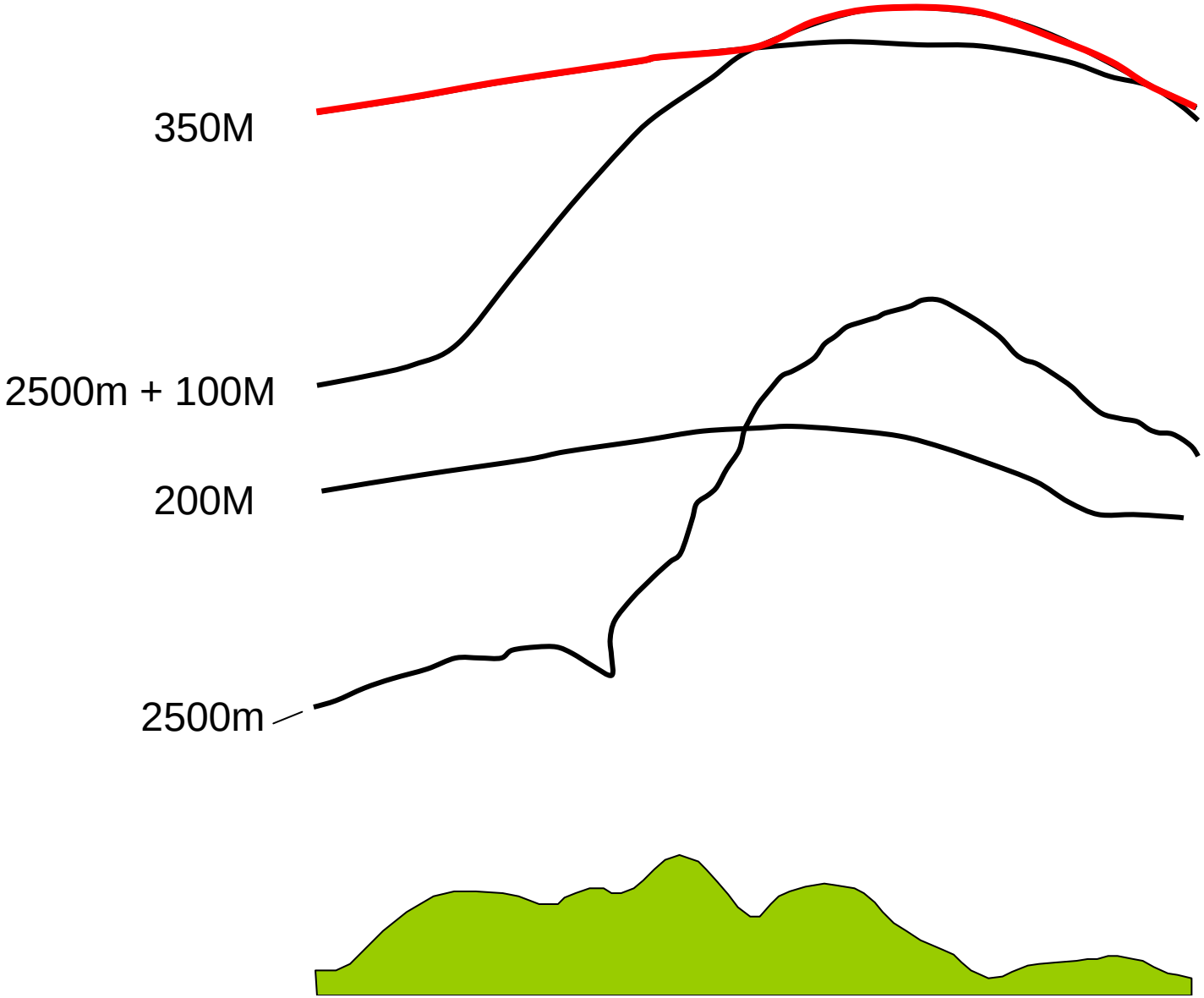
Seafloor morphology

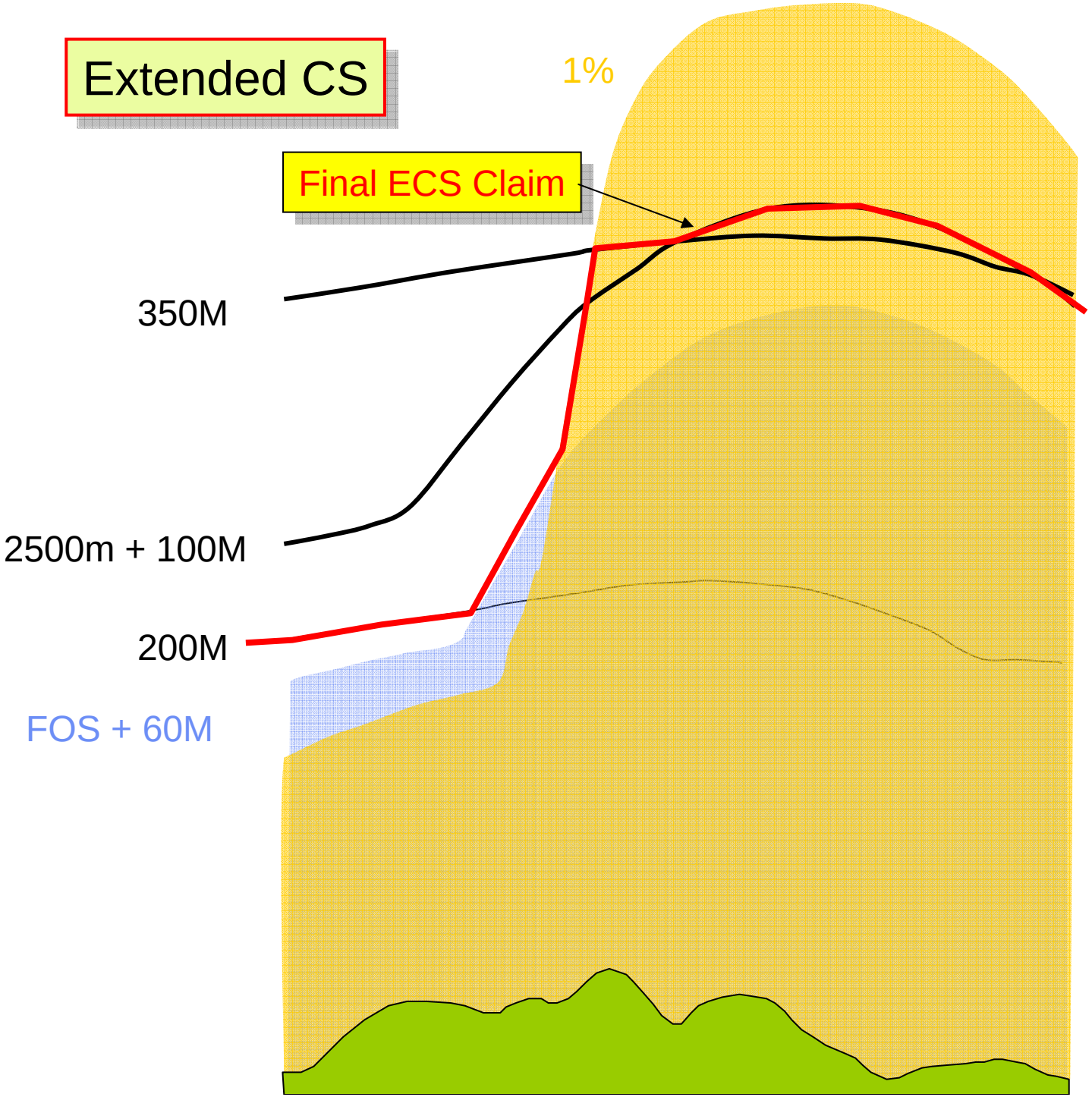


Seafloor geology



Art 76 constraints




Extended CS
1%
Final ECS Claim
350M
2500m + 100M
200M
FOS + 60M

Potential Areas of Extended Continental Shelf